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Agricultural Experiment Station

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Northeast Experiment Farm

—at—

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—by—

A. J. McGuire, Supt.

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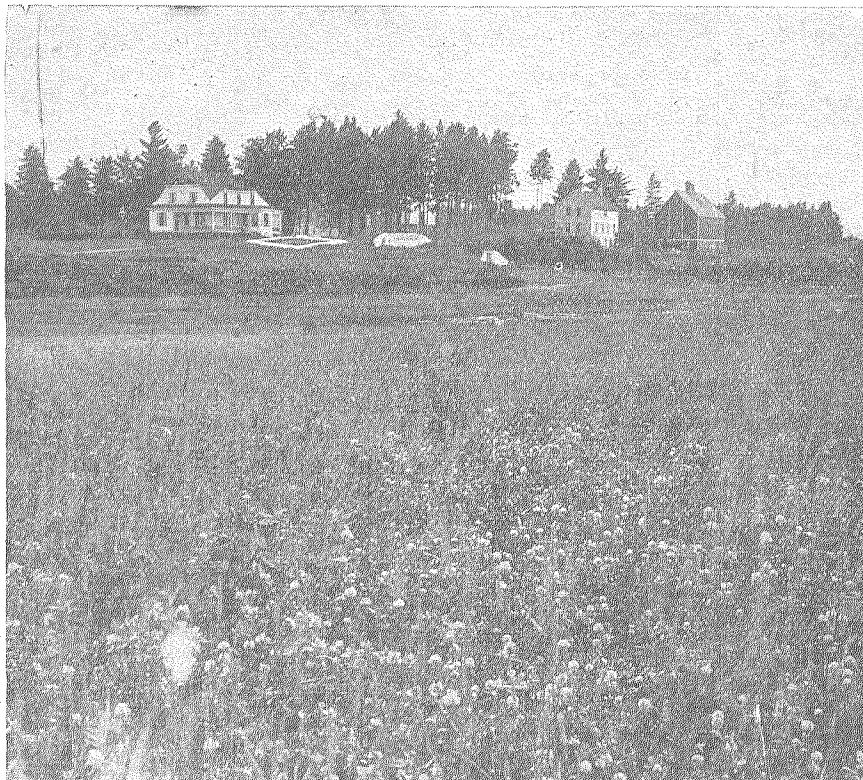
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THE NORTHEAST EXPERIMENT FARM
Clover in Foreground



NORTHEASTERN Minnesota or the timbered section of the state comprises 30,000 square miles, one-third of the entire area of the state. Of this there are 10,000,000 acres of high land that are well adapted to profitable agriculture, and uncultivated at the present time. There is room for 100,000 farmers in Northeastern Minnesota.

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This Bulletin contains information on the following subjects:

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Method of growing Grain Crops

Dairy Herd Record and Care of Dairy Herd

Improvement of the Dairy Herd and Cooperative Breeding Associations.

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Fodder Corn

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Vegetables

Small Fruit and the Orchard

The Bacon Hog

Butter Making on the Farm

Clearing Land Through the Use of Dynamite

The Relationship of the Liquor Traffic to Agriculture in Northeastern Minnesota

INTRODUCTION

The contents of this publication aim to present three things:

FIRST: To show the agricultural possibilities of the country—that it is well adapted to farming.

SECOND: To encourage a system of farming that is best suited to the natural conditions of the country.

THIRD: To explain in detail the work of this system of farming—the cultivation of crops, the care of the farm animals, and the disposition of the products so that the best and most profitable results may be obtained.

It will be noted that the yield of the different crops and the production of the farm animals are not extraordinary. The aim has not been to make them so, except thru means that the average farmer may employ. We have taken such fields and stock as the average farmer has at his command and are working along lines that are practical for him, and the results obtained have been profitable.

The chief aim of this publication has been to help the farmers of Northeastern Minnesota—the farmers who with small means are working under pioneer conditions. If in this respect it may be useful, its purpose has been accomplished.

THE RESULTS OF THE YEAR

With the conclusion of 1908 we may look back over the results of the year, and from its experience shape more wisely the work of the coming year.

The state farm, as it is called by the neighbors, has prospered, and it is hoped that every farmer in Northeastern Minnesota has gained some good in the way of a better farm, a more comfortable home, and a greater knowledge and respect for his employment.

While Northeastern Minnesota has not had as great an increase in settlement the past year as its needs demand, there have been developments that are most encouraging for the farmer: the extension of railroads, the numerous new mining towns all calling for farm produce, and most of all the interest in the development of agriculture that is being shown by every one, from the homesteader to even the mining engineer. "More farmers and better farming for Northeastern Minnesota" has come to be the watch word. Pass it along till this section of our fair state is contributing its rich share to agriculture, till there is a farmer on every eighty acres of land, till every swamp is drained and every needed road is built, till every farmer real-

izes that farming is a business, and requires system, and study and cooperation with his fellow farmers, for success, even more than the business of the man who lives in town.

The work of the experiment farm during the past year has been along the same line as described in the former bulletin, a system of practical farming with dairying as the foundation, the alternation of clover with grain and cultivated crops, selling only finished products: butter, meat, eggs, potatoes, vegetables and small fruits. The grain, hay, fodder, corn and roots are fed on the farm, and the fertility which they contain is largely returned to the soil in manure. 400 loads of stable manure were hauled out during the year and applied to the field. Thru this and the growing of clover the soil of the farm is becoming a richer soil each year. Not only on the experiment farm but throughout Northeastern Minnesota, the farmers who are practicing crop rotation—growing clover alternately on all the fields of the farm, and manuring each field every three or four years, are securing equally good results.

That dairying is to be the system of farming for Northeastern Minnesota is coming to be generally accepted. It is the dairy farmer who is now prospering most. The farmer who grows clover and feeds it on the farm,

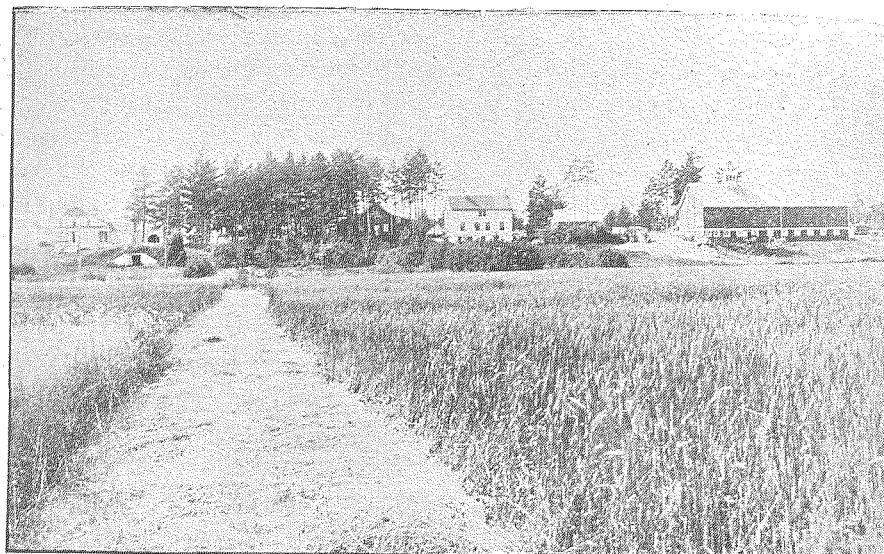
feeds it to the most productive of all animals, the dairy cow.

To increase the number of cows in Northeastern Minnesota, and to increase the acreage under cultivation so that feed may be grown for them, is the most important agricultural subject we have to consider.

Fifty farmers in any community with ten cows each can afford a

creamery. With a production of 200 pounds of butter to the cow per year at 25 cents per pound, there would be an income to that community of \$25,000 a year, this for butter alone.

The ways and means of this industry are worthy of consideration. It is only through consideration and study that it may be brought about.



NORTHEAST EXPERIMENT FARM

CROP REPORT FOR THE YEAR 1907

Eighty acres of the experiment farm is given to a system of farming considered practical and best for this section of the state.

1907 was the second year crops were grown in the rotation that is to be followed on the different fields of this 80-acre tract.

The acreage grown to the different crops are as follows: Wheat 4 acres; Oats, 20 acres; Barley, 6 acres; Peas, 2 acres; Clover, 20 acres; Fodder corn 14 acres; Stock roots, 2 acres; Potatoes, 4 acres; tame pastures (clover and timothy) 8 acres.

In 1907 the wheat yielded 17 bushels per acre. The average yield of the state was 13 bushels, of the United States 13.2 bushels.

Oats 35.5 bu. per acre, that of the state 24.5 bu., of the United States 23.7 bu.

Barley 22.7 bushels per acre, that of the state 22.5 of the United States 23.8 bushels.

Peas 8 bus. per acre, in 1906, 21 bus. per acre, in 1905, 16 bus. per acre.

Clover hay, 3 tons per acre, first cutting. Second crop mostly pastured.

Fodder corn 11.5 tons per acre green (cut for ensilage) Field cured 6 tons per acre.

Stock roots 10 tons per acre, or 385 bus. In 1906 15 $\frac{1}{2}$ tons per acre.

Potatoes 184 bus. per acre, average of state 101 bus., of United States 95.4 bus.

The above is the yield of the 80 acres under field conditions. Some parts yielded much higher than others owing to better drainage etc., but the average of all was taken.

This yield may be considered only fair as a measure of the productiveness of this section, owing to the very late and cold spring, which was general throughout the northwest.

The wheat grown was Minn. 169, an improved variety of blue stem. Oats, improved Ligowa; Barley, Mandischeuri; Peas Canada field; Clover, medium red (some Alsike); Fodder corn, Minn. 13; Potatoes, Carmen No. 1; Roots, Mastodon stock carrot.

The wheat, oats, barley and potatoes are the selection of several years from a great many varieties. They are the varieties found to do best in this section of the state.

HOW THE GRAIN CROPS WERE GROWN

The wheat crop that yielded 17 bushels per acre was grown on a field that had been in potatoes in 1906, in fodder corn in 1905, and in clover in 1904. It was manured lightly for the fodder corn and the potatoes.

This is a four-year rotation: clover, fodder corn, potatoes, wheat. 1907 was the fourth year of the rotation and will begin over again this coming spring, clover having been seeded with the wheat.

When this field is grown to wheat again in 1911 a much larger yield is expected as the soil was in a low state of fertility when the rotation was begun, and this rotation is expected to make the soil a more fertile and productive soil each succeeding year, due to being frequently manured, to the clover that is grown, and to the cultivation in the corn and potato crop.

The ground was not plowed

after the potato crop. A spring tooth harrow was used in preparing the seed bed, the soil being a sandy loam and easily worked.

The seed was sown with a grain drill, 1 1-3 bushels per acre.

Wheat is recommended to be grown only on a small scale in this section of the state, for milling purposes where there is a flour mill, or to be fed on the farm.

OATS: The twenty acres oats yielding 35½ bushels per acre was grown on different fields and under different rotations. The first rotation was oats, barley, clover, fodder corn. This is also a four-year rotation, each field being in clover once every four years, and manured every fourth year.

In the second rotation there are two fields, each in oats two years, followed with clover two years.

This affords comparison with the first rotation where oats is grown on the same field only once in four years, where the field is manured and a cultivated crop grown every fourth year.

The third rotation is on two fields: Oats, clover pasture two years, fodder corn.

1907 was the first year oats was grown in these different rotations so comparisons in yield of the different fields is not made.

The first rotation is considered best, and the one from which the largest yield is expected. This kind of a rotation in which a cultivated crop and a grass crop are alternated with a grain crop gives best results for different reasons. The fertility of the soil is kept more uniform, the crop is less subject to disease than when grown continuously on the same field and the intervention of the grass crop and cultivated crop tends to keep out weeds.

Oats is one of the best yielding and best paying grain crops to grow in this section of the state.

Over 30 varieties have been grown on the Experiment Farm and of these the Improved Ligowa has proved best and is now entirely grown for the field crop.

BARLEY: Barley is grown principally for hog feed and takes the place of corn for fattening hogs in this section of the state.

One field of barley is grown in the rotation with oats, as explained above. Another field is grown in another four-year rotation with clover, peas and roots. The barley follows the root crop and in this rotation promises to do exceptionally well.

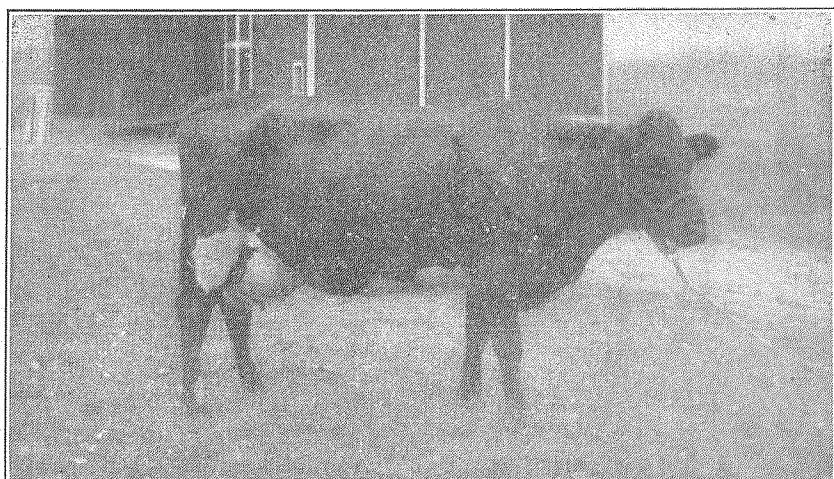
PEAS: The growing of peas as a field crop has been something of an experiment, but the

results have been quite satisfactory, giving an average yield of 15 bushels per acre the three past years. They are grown in the above rotation with barley, clover and roots.

They are sown early in the spring, $3\frac{1}{2}$ bushels per acre if sown alone, 3 bushels if sown with oats, using $\frac{1}{2}$ bushel oats

In harvesting they are cut

with a mower, and forked into piles as each swath is cut. They are left in the piles till thrashed, turning if need be when rained upon. They should be cut before dead ripe, otherwise much will be lost by shell ing. They cure nicely in the pile. As barley they are used for hog feed and produce a very choice quality of meat.



ROXY—Cow bought for \$40. Breeding unknown. Average yearly record for three years: Milk 6,903 lbs; butter 347 lbs; value of butter \$102; cost of feed \$40.58; net profit \$61.54

DAIRY HERD RECORD 1907

Number of cows milked.....	17
Pounds of milk per cow.....	4,730
Pounds of butter per cow...	222
Value of butter at 28c lb...\$64.54	
Cost of feed per cow, Oct.	
15 to May 15.....\$29.50	
Net profit per cow.....\$35.04	
Of the 17 cows milked 7 were heifers.	
Breed: Common grade cows,	

such as may be found on the average farm, the object being to show what may be done with the common cow.

The average milking period was 10 months.

Four-fifths of the cows fresh ened in September. The feed from Sept. 1 to Oct. 15 was second crop clover pasture, from October 15 to

Dec. 1, fodder corn, stock carrots, and bran and shorts half and half. After Dec. 1 the fodder corn was replaced with clover and timothy hay and the stock roots with fodder corn ensilage.

The fodder corn was fed whole in bundles, a load being hauled in from the field as needed. It was fed in the manger, and there was no waste whatever. It contained much of its succulence and gave very satisfactory results.

The stock carrots were also fed whole and with the tops while they were being taken from the field. This was done in the way of an experiment for economy in time. While there were no bad results from feeding them whole, it is more desirable to cut them when time will permit.

The ensilage was made from fodder corn grown so thickly that no ears ever formed. It was cut Aug. 28, about two weeks after it had tasseled out, or soon after it had reached its maximum growth. Its yield on the higher land, not so much affected by the wet season, was 10 tons per acre. The quality of the ensilage made of this was first class and gave very satisfactory results as a succulent winter feed. Compared with roots (stock carrots) ensilage gives a little better result pound for pound.

The quantity of grain fed (bran and shorts) was determined by the quantity of milk given by each individual cow: two-fifths the number of pounds of grain the cow could be made to give pounds of milk. A cow giving 10 pounds of milk daily got 4 pounds of grain, one giving 20 pounds of milk, 8 pounds of grain, and one giving 30 pounds of milk, 12 pounds of grain. In connection

with this from 18 to 24 pounds of roots or ensilage were fed and all the fodder corn or hay that would be eaten up clean.

During the winter the feed per cow averaged about 6 pounds of grain, 10 pounds of hay and 20 pounds of ensilage daily. They also had access to the straw used for bedding.

The price of bran and shorts was figured at \$25 per ton, hay at \$10 per ton, and ensilage at \$2 per ton. It is estimated that the skim milk, calves and manure will pay for the labor and pasture.

The system of caring for the cows is one that is planned to economize as much in labor in the barn as possible so as to combine with the other farm work, as would be necessary and practical on the average farm.

The cows are fed but twice a day and watered once a day. The feeding, milking and separating is done before breakfast in the morning, and between 4 and 6 o'clock in the evening, giving a fair day's time to the other farm work. The boys get to the barn at 5:10 in the morning and all the work is done on schedule time and in definite order. No farm hand ever objects to the dairy work, as the barn is clean, warm, and well lighted, and things arranged so that the work may be done most conveniently. In the evening it is not added to a full day's work, but made a part of the regular day's work, and finished at 6 o'clock.

The cows are turned out for a short time every day when the weather is at all pleasant, as they are turned out every day for water on the average farm.

The length of time they are left out is determined by a rule that is easy to remember, and important:

"As long as a man would care to be out without an overcoat, and not working." The most common mistake made by farmers in caring for their stock is in leaving milch cows out of doors the greater part of the day in winter. When a cow is uncomfortable from the cold or any other cause she will produce but little milk.

The record of the herd for the past year (222 lbs. of butter per cow) is considered only fair. It was lowered considerably by the number of heifers in the herd but even then it is unsatisfactory. No farmer should be satisfied with cows that average less than 300 lbs. of butter yearly, and it is our aim to breed up a herd that will do even better than this, and thru ways that may be followed by the average farmer. We are now using a pure bred Guernsey sire, and by keeping a record with the individual cows the poorer ones may be culled out, and heifers raised from the better cows to replace them.

There is often a great difference between cows, even of the same breed and getting the same feed and care. The only sure way to determine the better cows from the poorer ones is by weighing the milk and testing it. Weighing the milk of each cow every day may seem unpractical but there is nothing on the farm that is more practical or of more value. It is a business proposition. A farmer who keeps a record with his herd won't sell a cow for \$30 or \$40 that will make over \$50 net profit in a single year, and on the other hand he won't keep a cow very many years that doesn't pay for her feed.

A daily record will tell more than that. It tells the comparative

value or milk producing quality of different feeds. It will tell you that it doesn't pay to leave the cows out on a cold day, or to be irregular in feeding and milking them. And most of all it will give you an interest in the work. Instead of mere milking it becomes a business and gradually you will come to see that dairying is the most profitable work you can engage in as a farmer.

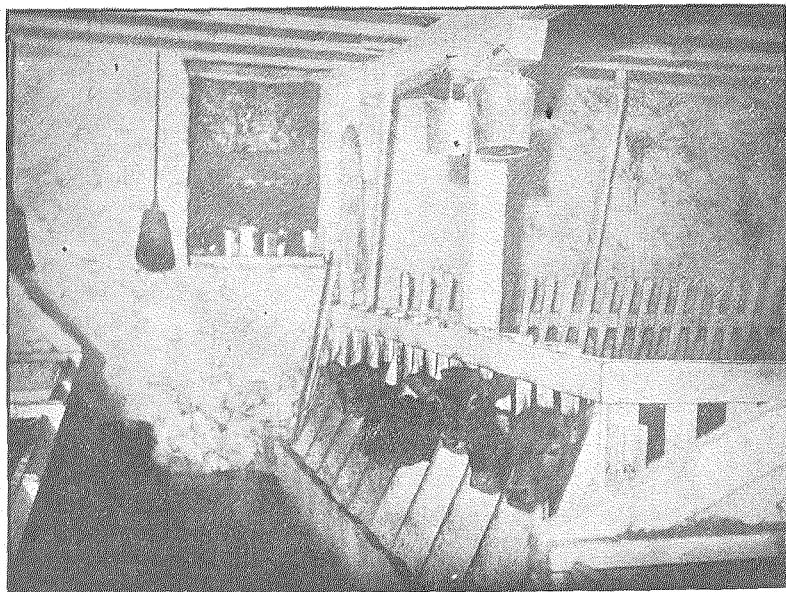
Dairy farmers the world over are the most prosperous farmers and there is a reason for it. A dairy cow is the most productive of all farm animals. The common cow is capable of producing 5,000 lbs. of milk yearly or over two and one-half tons. To one who has never kept a record with cows this may seem incredible but this amount is only common. Well bred dairy cows produce 8,000 lbs. of milk yearly on an average and in exceptional cases cows have produced over twice this amount.

Aside from the productiveness of the cow there is another reason why dairy farmers are generally prosperous. In raising grain from \$8 to 12 worth of soil fertility is sold from the farm in every ton of grain, but when this grain is fed on the farm and the products sold in the form of butter, less than 50 cents worth of fertility is sold. The ton of grain containing \$10 worth of fertility sells at from \$20 to \$35. The ton of butter containing less than 50 cent's worth of fertility sells for over \$500.

Northeastern Minnesota has natural conditions very favorable to the dairy industry. The general sentiment now is for dairying. Already the farmers' co-operative creamery is being successfully operated in many sections. Whenever 300 or more cows can be had

within a township a creamery may safely be started. Information in organizing a co-operative creamery association, and building and equipping a creamery will be gladly furnished upon application. We

have started to raise a breed of dairy cattle (the Guernseys) and what breeding animals we shall have to spare will be for sale at a very reasonable price.



Hurry up with that skim milk!!

Average of Three Years Record

Milk and butter production, value of butter, cost of feed and net profit of nine mature cows having three consecutive year records

Name of Cow	Pounds of Milk	Pounds of Butter	Value of Butter	Cost of Feed	Net Profit
Bell.....	4634.7	208.91	\$ 56.01	\$ 27.67	\$ 28.34
Distant.....	5630.6	291.35	78.84	29.42	49.42
Grace.....	5337.5	268.04	71.51	31.09	40.41
Lucy.....	4875	238.17	62.74	30.11	32.49
Mary.....	6157.3	314.70	73.43	33.79	49.76
Millie.....	4254.8	198.29	53.84	28.51	25.33
Roxy.....	6903.5	347.80	102.12	40.58	61.54
Sella.....	4403.5	208.26	55.46	30.25	25.21
Stuffy.....	3959	208.72	56.25	30.02	26.23
Average	5250.4	253.8	\$ 69.02	\$ 31.27	\$ 37.66

IMPROVEMENT OF THE DAIRY HERD

CO-OPERATIVE BREEDING ASSOCIATION

The common cows of Minnesota kept for dairying average only 160 pounds of butter yearly. Common cows of the dairy type kept on the Northeast Experiment farm have averaged 250 pounds of butter yearly. Dairy bred cows kept on the Experiment Farm at St. Anthony park have averaged over 300 pounds of butter yearly.

Between the common cows of the state and the common cows kept on the Northeast Experiment farm there is a difference of 90 pounds of butter a year, or a cash difference of \$22.50. This is due to a difference in care and feeding and lack of judicious selection on the part of the farmer: keeping a cow regardless of her type and performance.

Between the common cows of the state and the dairy bred cows kept on the experiment farm at St. Anthony Park there is a difference of 140 pounds of butter yearly or a cash difference of \$35 due to a lack of breeding along with the other causes mentioned—feeding, care and selection.

No further argument is necessary to show the importance of improvement in the dairy herd of the average farm.

Improvement must begin with better feed and more of it. Clover and fodder corn and roots must replace the marsh hay for winter feed, and the brush pasture must be cleared up and disked and sown to clover, timothy and blue grass for summer feed.

The barns must be so con-

structed that the cows will be comfortable during the half year they must be kept in doors and the dairy work so systematized that the feeding and milking are done with regularity.

The dairy cow that will produce six, eight and even ten thousand pounds of milk in a single year is the greatest improvement on nature that has been made, and she won't do it unless she is protected and fed and cared for just in proportion. When her conditions are similar and some times worse than those of the wild cow under natural conditions on the plains she will go back to what nature intended her to do, give milk enough for her young.

Better conditions do not mean conditions so expensive that they are impractical for the average farmer. The log barn built by the farmer himself for his few cows may be made as comfortable and cleanly and in every way as suitable for a dairy barn as need be.

The big barn and the big expense don't necessarily make the profitable cow. It is in doing well the little everyday details of dairy work, and in having a cow that is capable of producing from 250 to 300 pounds of butter a year when her conditions are made favorable to that production.

Improving the Breed—There are three essential parts to improving the dairy herd: 1st, feed, care, etc.; 2nd, selection of the individual cow that is a good producer, and this can be known

only thru keeping a record of the milk and butter produced by each individual cow; and 3rd, by using a dairy bred sire of known dairy quality that will transmit this quality to his heifers.

CO-OPERATIVE BREEDING ASSOCIATION.

To get a sire that will make improvement in his heifers over the common cow, it is generally necessary to go outside the neighborhood. Unfortunately pure bred dairy herds are scarce. The cost of a pure bred sire is generally from \$75 to \$100, a price that the average frontier farmer feels that he cannot afford to pay. By eight or ten farmers clubbing together the amount for each one to pay would not be as much as the cost of a scrub animal, and one sire will do for eight or ten of the average herds as well as one.

To carry this co-operation still further and to secure the greatest improvement at the least expense, it is planned for all the farmers of the township to co-operate and buy 4 or 5 sires of the same breed, but unrelated. Have one sire for every ten herds, and exchange from one community of herds to another every two years so that inbreeding would not be practiced. In this way the sires could be kept for eight or ten years. As it is now the sire is often despised of at 3 or 4 years of age which is only at the beginning of his greatest usefulness, and power of transmission. The best heifers are from the mature sires.

This plan of breeding has already been adopted by one community of farmers in Northern Minnesota the farmers of the

Meadow Co-operative Creamery association of Berner, Clearwater county.

They bought five pure bred sires in co-operation under the plan previously outlined. Within a few years that farming community will be noted for the breed of cattle they have selected. They are noted now for being the first association of farmers in the state to take up this plan of co-operative cattle breeding. It is further worthy of note that this association of farmers lives in a back woods section, twenty-five miles from a railroad station. Their local creamery is their market, and when they haul a load from there to the railway, over their long road, it is a ton of butter, worth today some \$600.

Dairying is the industry for the great majority of farmers of Northeastern Minnesota and we should all pursue this wise policy of improving our common cows.

The Experiment Farm is in position to assist the farmers in securing breeding stock. We are in co-operation with several breeders in this section of the state and we have a large number of animals to select from aside from the Experiment Farm herd.

The plan is for the Experiment Farm to co-operate with every farmers' association and every farmer who buys a breeding animal, and to act as a medium of exchange when exchange is desired.

High grade sires of good quality will be sold at a medium price to farmers who cannot afford a pure bred animal, and where a

co-operative association cannot be formed. Where there is a co-operative creamery there should be a co-operative breeders' association.

Where the co-operative creamery does not exist, a co-operative breeding association would be the best movement that could be made toward the creamery.

Co-operation is the most potent factor toward industrial and business success in the world today. It is just as important in farming as it is in any other in-

dustry. The co-operative creamery is the very foundation of successful dairying. A co-operative breeding association that requires only from \$100 to \$150 from every ten farmers will prove the greatest factor toward making the successful creamery.

If you are interested in securing breeding stock write to the Experiment Farm, Grand Rapids, Minn.

Dairy bred bull calves for sale. Price \$20 and upward.

CLOVER

CLOVER: The ease and abundance in which clover grows in this section of the state is the strongest indorsement of its agricultural possibilities. Wherever clover may be grown, farming may be conducted successfully.

Clover is not only one of the most valuable feeds for all kinds of stock, but it enriches the soil where it is grown.

Clover is grown in every rotation and on every field on the Experiment Farm at least every fourth year. This is done to give all the fields its benefit. Generally it is used but one year and then plowed up for some other crop. Owing to the high price of clover seed, this frequent reseeding may seem an extra expense, but the increased yield not only in clover but in the crops that follow, pays for the seed many times. In fact the

increased yield from one acre of the first year cutting over that of an old field will more than pay for the seed of ten acres.

Clover may be seeded with any kind of grain in this section of the state. The growth is so vigorous that no consideration need be given to nurse crop.

It may be seeded with or without timothy. On the Experiment Farm a mixture of the two is used, about half and half in weight. It cures more easily and makes a finer quality of hay than if grown alone. From 6 to 10 pounds of seed per acre and the same of timothy, owing to the richness of the soil, moisture, etc.

Use medium red clover for the upland hay crop, mammoth for plowing under (recommended only for very sandy soil), and alsike for low land that is in

danger of standing water and where it is left in meadow more than two years. Clover hay is a valuable feed for dairy cows, but requires considerable care in curing to retain all its quality. It should be cut early, rather than too late, and put up green rather than over dried or rained upon. Best results are secured when cut in full bloom. Our system in haying is to cut one day, and get in the mow the next. The hay may be sufficiently cured in this time when

the weather is favorable. A hay-tedder is very necessary in curing clover hay that yields from 2 to $3\frac{1}{2}$ tons per acre. Hay that is cut one forenoon is tedded the next morning as soon as the dew is off, and again just before dinner. The rake is started in the afternoon, and the hay hauled in at once. One ton of clover hay cured in this way is worth two tons of hay that has been rained on and weather-beaten, especially in the production of milk.



Fodder Corn on Experiment Farm, 1908 Crop—12 tons (green) per acre

FODDER CORN

FODDER CORN: Fodder corn is corn sown in drills so thickly that no ears are formed. It is

used instead of hay, more especially with cattle and sheep and may be fed with good results to horses.

In feeding value it is better than timothy hay, especially for dairy cows.

It yields from two to four times as much per acre as hay. It has yielded as high as eight tons of cured fodder per acre on the Experiment Farm.

A crop may be harvested the same season it is sown which can not be done with hay.

It is a cultivated crop and has a value in this respect, in that it tends to keep out weeds, quack grass, etc., and this cultivation also improves the soil mechanically.

Fourteen acres are grown every year on the Experiment Farm.

It follows clover in the rotation, and is used as a feed in connection with clover.

In preparing the field for fodder corn, the clover sod is manured and plowed in the spring. It might be plowed in the fall with good results, but it is deferred till spring for the winter supply of manure. The field is harrowed smooth, and the corn sown with a grain drill in rows three feet apart. The drill is made to seed in three-foot rows by stopping up all the cups but those three feet apart.

In the absence of a grain drill a garden drill may be used to good advantage, and this should be on every farm.

The corn is sown from May 15 to June 10, according to the condi-

tion of the season.

About three-quarter of a bushel of seed is sown per acre.

The field is harrowed frequently till the corn is up, and then cultivated every week or ten days throughout the growing season.

It is harvested when it has reached its maximum growth, or earlier if in danger of frost.

The past year it was sown June 4 (late season) and harvested Aug. 25. Its yield was 11.5 tons per acre, green weight.

One hundred tons were put in the silo, and the balance shocked up in the field and cured for fodder.

The greatest amount of feed can be gotten from fodder corn, and in the most nutritious form, when put in the silo. Fodder corn made into ensilage, has practically the same feeding value as if fed green from the field. It is one of the best feeds for dairy cows during the winter and easiest to handle, but owing to the cost of the silo and machinery, it is recommended only to farmers keeping fifteen or more cows and who can afford its first cost. During the life of a well constructed silo, the entire cost of building, machinery, and all the expense of growing the fodder and getting it in the silo do not exceed \$2 a ton, as a cost on the ensilage as a feed.

At the present time, however,

the silo is only for a few in this section of the state, but fodder corn may, and should be, grown by every farmer, not to the exclusion of clover, but to feed in connection with it, or it may be fed the fore part of the season, when it gives best results, and clover the latter part. By growing fodder corn, at least a third more

stock can be kept on the same number of acres.

It should be planted on well drained land. The soil cannot be too rich.

The seed may be bought from any of the large seed firms, if not on the local market. No. 13 has given the best results on the Experiment Farm.

STOCK ROOTS

Stock roots under ordinary field conditions yield from 10 to 15 tons per acre; from 350 to 550 bushels. When the soil is very fertile and given extra care, they may be made to yield as high as 30 tons, or 1000 bushels per acre.

The cost of growing roots, taking everything into consideration such as value of land, cost of machinery, seed, labor, etc., need not exceed \$25 per acre, or from \$1 to \$1.75 per ton.

Two acres of stock roots are grown on the Experiment Farm every year. They are grown in a rotation with barley, clover and peas.

They are sown with a garden drill in rows 24 inches apart. When the plants appear above ground they are gone over with a wheel hoe and later with a horse cultivator every week thru out the growing season.

When the plants are about two

inches high they are thinned out, a common hand hoe being used for this purpose. The stock carrot is thinned to 8 inches, and the rutabaga and mangle to 12. Thinning the plants early with the hoe lessens the hand thinning later. With the plants well apart they are much easier kept clean, and their yield is greater than when grown thickly.

In pulling the roots in the fall they are laid even in the row with the tops all one way. The topping is then done with a corn knife, cutting the tops of two and three with a single stroke.

The roots that are fed early in the fall before they are put in the root cellar may be fed tops and all, thus lessening the labor.

In storing the roots for winter a cellar is necessary and should be in connection with the barn for convenience in feeding. Roots that are to be fed in October, November and the fore part of

December may be piled on the ground near the barn and covered over with straw and litter sufficiently to keep from freezing.

In storing the roots in a cellar care must be taken to remove as much of the dirt as possible to avoid heating. The more free from dirt the better they will keep.

In feeding carrots and mangles to stock it is desirable to cut them, but not necessary. When the fall work is rushing they may be fed whole, but later when time is ample it is advisable to cut them.

Mangles, sugar beets, stock carrots and rutabagas have been compared on the Experiment Farm. On high well drained soil and in a favorable season, mangles give the largest yield, but on low ground and in a cold wet spring they are apt to fail. This is also true of the sugar beet. Stock carrots have never failed to produce a crop. Rutabagas are also very hardy but objectionable for dairy cows.

Taking all conditions into consideration, the stock carrot is recommended for this section of the state. Rutabagas may be grown for sheep, pigs and young stock, but either the stock carrot or mangle for dairy cows.

A sandy loam soil is best for roots. It should be well man-

ured. In preparing the seed bed harrow thoroly immediately after plowing as the soil is most easily pulverized at that time. It is also well to plank or roll it before seeding as the garden drill is difficult to work in uneven ground. A garden drill is the first thing that should be secured in preparing to grow roots. With a garden drill an acre can be sown in half a day. A good drill may be bought for \$8 or \$10. Two or more farmers may buy one in co-operation to good advantage.

In seeding sow plenty of seed. The surplus may be thinned out easily.

For carrots or rutabagas sow from $1\frac{1}{2}$ to 2 pounds per acre, for mangles 15 to 20 pounds.

The time to plant will depend upon the season, from May 10 to June 10. Carrots and rutabagas may be seeded quite early without danger. Rutabagas may be sown as late as July and a good crop secured, but early planting is safer.

Grow roots. The money you spend on one ton of bran or shorts if invested in an acre of roots will produce from four to five times as much feed.

Live stock of all kinds need some succulent feed in winter to be healthy. When roots are fed there will be no need for expensive stock foods and medi-

cines. Grow roots. They have a food value not only in themselves but also in the effect they

have on other feeds fed in connection with them, making them more digestible and nutritious.



Potato Digger at Work, 1908 Crop—180 bus. per acre

POTATOES

Potatoes are the main market crop for Northeastern Minnesota.

The soil and climate is especially favorable to their growth.

Under fair conditions they yield from 175 to 225 bushels per acre.

The cost of growing them need not exceed \$25 per acre.

The market price the past five years in this section of the state has averaged 69 cents per bu.

Four acres of potatoes are

grown on the Experiment Farm every year. They are grown in a rotation with wheat, clover and fodder corn. The ground is manured lightly for the fodder corn and again for the potatoes.

The Carmen No. 1 potato is grown exclusively on these four acres. Other varieties are grown on small plots, and in comparison with the Carmen, but none have been found to yield so well, or to be as satisfactory in general as the Carmen.

The Carmen is a white potato, oval in shape, and medium to late in maturing. It is quite firm in texture, good flavor, keeps well, and is one of the best selling potatoes on the market.

The Carmen No. 3 potato is frequently inquired for in comparison with No. 1. They are practically the same.

For an early potato the Early Sunlight or Early Ohio is recommended.

The past year modern potato machinery was used on the Experiment Farm, the Aspinwall planter and sprayer, and a Hoover digger. These "makes" of potato machinery are not recommended as better than others, as they were not used in comparison with other "makes." They proved practical and satisfactory, however, and for growing potatoes on a large scale potato machinery is recommended. From 3 to 4 acres can be planted or dug in a day. The sprayer sprays four rows at a time and a four or five acre field can be gone over in a quarter of a day.

For a potato digger to work at its best the field should be quite free from weeds and grass, also of stones.

In the growing of potatoes there are a few general rules that are profitable to follow:

Select good seed. Get a good

variety, and keep it pure, and stick to it till you are sure of improvement by changing. By selecting the best potatoes for seed every year it becomes a better variety. Small, inferior seed tends to run out the crop.

Scabby seed produces scabby potatoes, and not only this but infests the soil, so that potatoes on the same ground within the next two or three years will be affected. For this and other reasons potatoes should be grown on the same land but once every third or fourth year. Scab may be destroyed on seed potatoes by treating the seed with formaldehyde, one quart of formaldehyde in three-quarters of a barrel of water. Put the potatoes in sacks and submerge in the barrel for two or three hours. This formaldehyde is a poison and potatoes treated in it should be used for seed only. Formaldehyde can be bought at any drug store. It is cheap, and the treatment takes but little work, and should be used whenever there is any sign of scab.

A sandy loam soil is best for potatoes. It should be high land or well drained as potatoes drown out quickly on wet soil. In the rotation potatoes do best following clover. The soil cannot be too rich. The yield may be increased from one-third to one-half thru the use of barn yard manure.

On the Experiment Farm the potatoes are planted in rows 30 inches apart, and 18 inches apart in the row. After planting, the field is harrowed thoroughly every week till the potatoes are up, and then cultivated every week or ten days throughout the growing season.

The past two years the vines were sprayed for blight though the disease was not prevalent to any marked extent. The treatment used was blue vitrol 5 lbs., quick lime 3 lbs., dissolved in 50 gallons of water. This is known as Bordeaux Mixture and may be used for various kinds of blight.

In spraying the potato vines with this treatment paris green was also used with it to destroy the bugs.

In growing potatoes it is advisable to grow the same variety throughout the neighborhood. Where one or several carloads can be shipped of the same variety of potatoes it commands a much better market. This cannot be done where every farmer grows a different kind.

In storing potatoes there are

a few points that are well to consider. To keep well, potatoes should be mature, and as dry as possible when put in the cellar. Use small bins to allow circulation of air, and provide for good ventilation through the roof. Dry, cool air is necessary. The cooler the cellar can be kept without freezing, the better. A thermometer hung in the root cellar is of advantage.

As yet there are not sufficient potatoes grown in Northeastern Minnesota to supply the home market. Hundreds of carloads are shipped into Duluth and Superior and the mining towns from other sections.

The growing of potatoes to supply this home market may be developed to advantage of all.

Farmers should co-operate grow a uniform grade of potatoes, and aim to put only a high-grade of potatoes on the market. Keep the small potatoes at home.

As good potatoes can be grown in Northeastern Minnesota as anywhere in the country and it should at least supply its own market.

VEGETABLES

The growing of vegetables may be recommended in Northeastern Minnesota on a commercial scale as well as for the home

garden. The yield and quality of vegetables grown in this section of the state can hardly be surpassed. There is also an ex-

tensive market in the cities at the head of Lake Superior and the mining districts, but for the farmers not tributary there is difficulty in securing it. It is supplied largely by wholesale shippers from other districts. This market rightfully belongs to the farmers of Northeastern Minnesota and it may be obtained by co-operation among the

farmers, and it is only in this way that it can be. Wholesale dealers want vegetables in car-load lots, and vegetables of a uniform grade and quality.

Where a community of farmers would make vegetable growing an issue, and aim for uniformity, and co-operate in shipping, they could command a market for all they could grow.



PIE PLANT

For the farmer with only few acres under cultivation, vegetables, when they can be marketed, is the most profitable crop that can be grown.

On the Experiment Farm all the common garden vegetables have been grown successfully

with the exception of melons. Tomatoes and cucumbers have generally required a little extra care in the way of protection against late and early frosts to insure their maturity, and also the navy bean which is somewhat uncertain in ripening at

this degree of latitude (47 $\frac{1}{2}$). With these few exceptions the growing of vegetables has been exceedingly satisfactory.

Vegetables do best on a sandy loam soil, and the richer the soil in fertility and humus the better. A heavy application of stable manure every year is essential to the best growth of most vegetables. The ground should be manured and plowed in the fall, as fall plowing not only gives the best results in growth, but it also kills many destructive insects that live in the soil during the winter. It should not be harrowed till spring, but the earlier in the spring the better, as this will help to retain the moisture and kill weed seeds.

In laying out the garden it will be found more satisfactory to plant everything in rows than in the old-fashioned way of beds, and the rows far enough apart to permit of horse cultivation. The garden needs frequent cultivation, not only to keep it free from weeds but to retain the soil moisture. More can be done with a horse cultivator in an hour, than all day with the hoe. The cultivator does not dispense with the hoe, but it greatly lessens hand work which is much more expensive.

Questions are frequently referred to the Experiment Station regarding the best varieties of the different vegetables for

this section, and also the seed firm that handles the best grade of seed. Both these questions can be answered only in a general way. There are many varieties of most vegetables that do equally well and there are also several seed firms that handle practically the same grade of seed. A safe rule for the beginner is to use the well known varieties that have been on the market for several years, and the new stock that appears in every spring catalog only in an experimental way, if at all.

With some vegetables it is well to discriminate in early and late varieties. In tomatoes, cucumbers, beans, squash and pumpkins early varieties should be grown, while with cabbage early varieties to the extent of what will be used when mature, and late varieties for winter use, and late shipping.

In planting, tomatoes, celery, early cabbage, and cauliflower should be started in hot beds. Late cabbage is also started in this way, but it may be sown directly in the garden, very good results having been obtained through this system on the Experiment Farm.

The vegetables that command the best market in the fall for shipping are cabbage, carrots, beets, turnips and rutabagas, for the summer and early fall market, onions, peas, radishes, let-

tuce and cucumbers. These are the most staple products and safest to grow in a commercial way.

The successful sale of vegetables depends largely upon their quality, appearance and the way they are put up. Size alone does not indicate quality or make a product a good seller. Smoothness, uniformity and freeness from dirt and bruises in handling are quite as important as

size. A great deal may be learned about vegetables at an agricultural exhibit, by observing the vegetables that take prizes, when a competent judge is in charge.

For more detailed information in gardening write U. S. Department of Agriculture, Washington, D. C., for Farmers' Bulletin No. 94. It is free.

SMALL FRUIT AND THE ORCHARD

Most of the small fruits grow wild in Northeastern Minnesota, which is the strongest evidence of their adaptability to cultivation in this section.

The small fruits grown on the Experiment Farm are the strawberry, raspberry, currant, gooseberry, blackberry, buffalo berry, high bush cranberry and plum. Of these the strawberry, raspberry and currant have proved most profitable in a commercial way, and the growing of these may be strongly recommended in this section of the state from a business standpoint. For home use all the above fruit may be profitably grown.

STRAWBERRIES—Strawberries do best when set out in the spring. Plant in rows three feet apart and two feet apart in the row. Frequent cultivation is required the first season. What blossoms appear should be

picked off, as fruiting the first year weakens the plant. The runners should be kept in the row where they will form new plants.

It is recommended to cover the bed with straw or hay sometimes during the winter when the ground is frozen and covered with snow. The purpose of this is to keep the plants from blossoming in the spring till danger of frost is past. The straw should be removed as soon as the frost is out of the ground. It may be left between the rows as a mulch. The best results on the Experiment Farm, however, have been obtained when the straw has been removed entirely and the plants cultivated up to the time the berries are ready to pick.

Several varieties of strawberries have done nearly equally well among which are the Sen-

ator Dunlop, Splendid, Lovett, Clyde, Brandywine and Bederwood.

Strawberries grown in North-eastern Minnesota won practically all the prizes at the St. Louis exposition.

RASPBERRIES—Raspberries when set out are permanent, and do not require resetting as the strawberry. The canes, however, die after fruiting, and have to be cut out, and the young canes that come up every year need to be laid down in the fall and covered with earth to insure against winter killing. They blossom later in the spring than the strawberry and are seldom endangered by frost.

The red varieties do best in this section of the state and of these the Loudon, King and Marlboro have given best results.

CURRENTS—Both the red and white varieties of currants have done especially well. They require no winter protection, and find as ready a market as the strawberry or raspberry. The same may be said of the gooseberry though not commanding so good a market.

BLACKBERRY—The blackberry produces a very fine fruit. It requires the same care and protection as the raspberry. Its yield has not been nearly so well as the raspberry and its large and coarse growth of cane makes it disagreeable to handle.

BUFFALO BERRY—The buf-

falo berry grows into a small tree. Aside from its fruit it is useful as a hedge or for ornamental purposes. Its fruit has little commercial value, being used only for jelly, and for this use it is very highly favored.

Highbush Cranberry—This is still in an experimental stage as to its commercial value. It grows well.

THE PLUM—Nearly all the varieties of plums recommended for Minnesota have been grown and many of them have done very well, among which are the Cheeney, Wolf, Weaver, and New Ulm. The Aitkin plum which is frequently spoken of has been found unsatisfactory. It is the earliest in maturing, but a poor bearer and not hardy.

APPLES—The first apple orchard set out was put on a sandy soil and proved a failure. A second orchard was planted in a more favorable soil three years ago, but as yet is only in an experimental stage. About 50 per cent of the trees have winter killed, but those surviving promise to bear fruit. All the standard varieties were used, but no one thus far has proved hardier than the rest. The soil on which they are grown is not the best for apple trees being somewhat sandy. A clay soil is best and a farmer having clay soil favorably located for an orchard has a much greater assurance of success.

Apples are being grown very

successfully in certain sections of Northeastern Minnesota, and it is not evident that we are too far north. It is recommended, however, that in providing home grown fruit, to invest in apple trees only in an experimental way. A few trees are enough to start with. The best investment is in the smaller fruits, that are sure, and for home use fully as desirable as the apple.

The apple trees recommended as most hardy for this section of the state are the Duchess, Hi-

bernal, Charlamoff, Patten's Greening and Okabena.

In raising all kinds of fruit there is one rule we have found that is of importance in this section of the state, and that is to cultivate. Grass grows with such vigor and persistence that it will take possession of the ground even against plum trees. Cultivation is important especially during the early life of the plant, and at all times for the smaller fruits.

BUTTER MAKING AND CARE OF CREAM ON THE FARM

The first requirement in the making of good butter is pure milk, and this means a clean dairy barn, clean cows and a clean milker.

If the cream is raised in the old-fashioned way the milk must be set in a room or cellar where the air is pure and free from disagreeable odors.

If the cream is separated by the modern method of the hand separator, the separator should be washed after every separation. Milk pails, strainer, cans and all receptacles must be kept clean.

Milk and cream undergo more change than any other substance. In decomposing, milk or cream produces various forms of bacteria and when new milk or cream comes in contact with this bacteria it is quickly soured and spoiled.

Hence thoro washing. Cleanliness.

The second point to take into consideration in the making of good butter is the age of the cream before churning. Choice butter cannot be made from cream over three days old. Churn frequently. The common mistake made on the farm where only a few cows are kept is in keeping the cream too long before churning. If it will make only a pound of butter churn at least twice a week if you are making butter to sell.

CARE OF THE CREAM.

When the cream is skimmed it should be put in a vessel especially for the cream, and this vessel should be washed and scalded thoroly before using. For a few cows an earthern jar answers this purpose very well. The cream should be set in cold water and stirred thoroly every time new cream is added. Fresh separator cream should always be thoroly cooled before adding

to that previously separated. Cream should be kept sweet until within twelve hours before churning. To do this it must be kept cool. Cream should be soured to churn but only enough to thicken. To keep cream sweet it should be kept at a temperature below 55 degrees. To ripen it it should be at a temperature of from 65 to 70 degrees owing to age of cream and time in which it is required to ripen before churning. The temperature for churning is 60 degrees. In butter making a thermometer is very necessary.

CHURNING.

The old way of churning was to churn till the butter collected into a mass. This is no longer done in the modern method. The churning is ceased when the butter is in the granular form or about the size of wheat grains. The butter milk is then drawn off and the butter washed. The butter is washed in the churn by revolving it in water, the water being changed two or three times or until all trace of butter milk has been removed. The washing is a very important process as butter will not keep

well when all the butter milk is not removed. The salting may be done in the churn using an ounce of salt for every pound of butter.

It is preferable to pack butter in three or five pound jars as it sells best to local trade in this form. Butter should be marketed every week.

Be clean and keep everything clean in butter making.

Set the milk as soon as possible after milking if the separator is not used.

The quicker milk is cooled after milking and the lower the temperature the more cream will rise. Cream should be churned within twelve hours after souring.

Keep a thermometer and use it.

Use a barrel churn and never use it for a buttermilk vat. It should be kept sweet and pure.

Get your butter to market in good condition.

Keep the creamery in view.

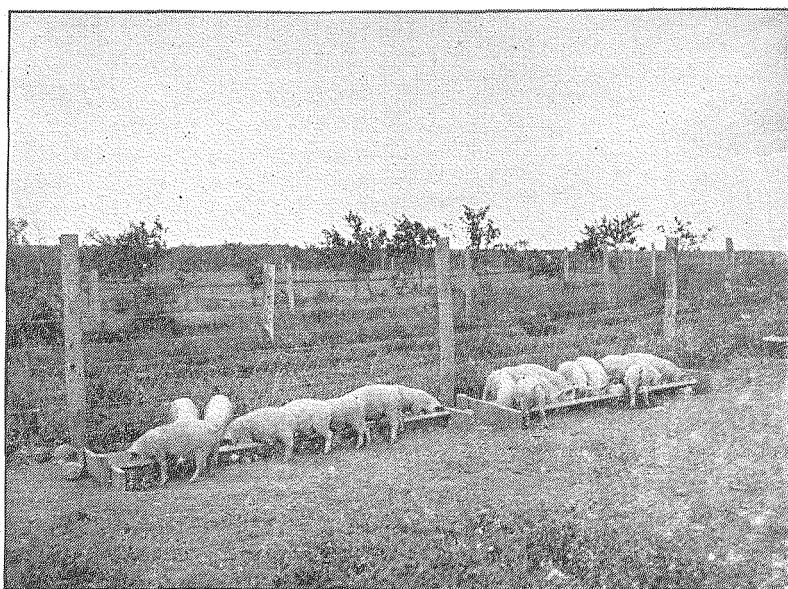
It will not pay to make butter at home when there are cows enough in the neighborhood for a successful creamery.

THE BACON HOG

Owing to the fact that corn is not grown in Northeastern Minnesota as safely and abundantly as barley and peas, it has been considered more profitable to raise a bacon breed of hogs rather than the lard breeds. For this reason a bacon breed (The Large Improved Yorkshire) has been raised exclusively on the Experiment Farm. It is this breed that is

raised so extensively and profitably in Canada and on precisely the same feed as is grown here in abundance, clover, roots, barley, peas and the by-product of the dairy, skim milk.

The method of raising pigs on the Experiment Farm is to have the sows farrow in March and April. A good clover pasture is provided and the young pigs are



Using the By-Products of the Dairy—Skim Milk

turned on this when weaned at from six weeks to two months old. In connection with the clover pasture they are fed skim milk and a little shorts, 1 lb. to 3 pigs per day. Sept. 1 barley and peas are added to the ration. For two months they are fed as much as they will eat, which generally brings them into prime condition for bacon. Their average dressed weight Nov. 1 is from 130 to 150 lbs. The average price for this kind of meat on the local market the past three years has been 8½ cents a lb. The cost of producing it, including the feed of the brood sows during the winter, has been 4½ cents per lb., making a net profit of \$4.00 per hundred. This profit may be considered good in hog raising in any section, even where corn is grown abundantly.

It is possible in this section of the state by the use of clover past-

ure and skim milk, and by having the pigs come early in the spring and disposing of them as soon as they can be fattened after the pasture season in the fall, to raise pigs as profitably as anywhere in the state. The increased demand for choice bacon makes this subject of raising bacon pigs in connection with dairying in this section of Minnesota a matter worthy of consideration.

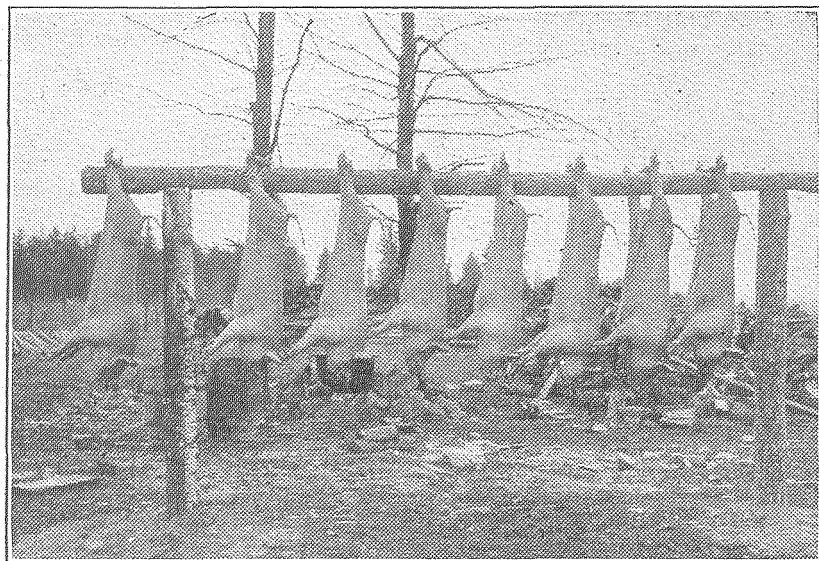
During the past three years 8 pigs have been raised per sow on the Experiment Farm. This is a large average, but it is characteristic of the Yorkshire breed to produce large litters and of strong constitution.

The brood sows on the Experiment Farm are wintered on second crop clover, boiled roots, skim milk and a very small allowance of grain ($\frac{1}{2}$ lb. per head a day). They are comfortably housed,

with access to a yard during the day, exercise being very necessary. They are bred in December to farrow in March, and only one litter a year. Fall pigs don't pay. Only brood sows should be carried thru the winter; and when a sow has proved to be a good mother she should be kept as long as she is productive, which is generally from 4 to 6 years.

The chief point to remember in

raising pigs in this section of the state is that about the only feed that profit can be realized from is clover pasture and skim milk. The expensive grains will only finish the product that has been grown on the inexpensive pasture and by-product of the dairy. Therefore aim to have the pigs come in early spring, and have a good pasture ready for them when they are ready for pasture.



A Finished Product—Eight Months Old Bacon Pigs

CLEARING LAND THROUGH THE USE OF DYNAMITE

In the clearing of land the removal of stumps has been the chief difficulty.

Various methods have been advocated and tried.

The most satisfactory method yet found, especially for stumps over 12 inches in diameter, is that of blasting, the use of dy-

namite. Dynamite properly placed under a stump will remove it entirely from the ground, and break it up into pieces so that it can be easily loaded and hauled from the field.

Dynamite, however, is not generally used by farmers. Being a powerful explosive it is regarded

as dangerous, and men who have had no experience with it are slow to take it up.

With proper knowledge of the use of dynamite, and care in handling it, dynamite may be used with as much safety as in handling the ordinary gun or firearm.

The explosion of dynamite takes place thru a heavy jar. Unlike powder it does not explode from coming in contact with fire, and in this respect is not nearly so dangerous as powder.

Before using dynamite, however, a careful study should be made of how it should be handled. Knowledge of its use will not only avoid danger, but it will enable one to secure better results.

Dynamite is now used almost exclusively by men who have made a study of clearing land. It is surely the quickest, easiest and most practical way to remove stumps that is yet known. Its economy will depend to a large extent upon the price paid, and also upon the experience or ability of the one using it.

The price of dynamite of the grade commonly used (40 per cent) varies from $10\frac{1}{2}$ to 20 cents per pound depending upon how and where bought. The wholesale price of dynamite in 100 lb. lots is from 12 to 13 cents per pound. In car load lots it may be secured as low as $10\frac{1}{2}$ cents per pound.

A pound of dynamite will generally blow a stump from 12 to 18 inches in diameter completely out of the ground, according to the condition of the stump and the condition of the ground.

From this the cost of clearing up a field may be estimated reasonably close.

During the past year (1908) dynamite was used for clearing land on the Experiment Farm and with very successful results. The coming season it is planned to conduct extensive experiments along this line.

From results obtained so far, and from information secured from various sources, dynamite is unhesitatingly recommended, and the following instructions are offered for its use.

Dynamite comes in half pound sticks, size, 1 inch in diameter and 8 inches long.

Dynamite freezes at a temperature 20 degrees higher than the freezing point of water, and if used when the weather is at all cold it has to be thawed out before using.

When frozen the explosion is very imperfect.

Whether the dynamite is frozen or not can be told by the feeling. When frozen it is hard. The stick is as unyielding to pressure of the fingers as a stick of wood. When not frozen the stick is yielding to pressure of the fingers.

To thaw place the dynamite in a small boiler or pail and place this in a larger boiler of hot water. The dynamite should not come in contact with the water.

It is necessary to keep the dynamite in the warming receptacle till ready to put under the stump as it quickly freezes again.

When the temperature of the day is 60 degrees or over of course there is no need of the

warming apparatus, but dynamiting frequently being done in the early spring requires this attention.

A dynamite is now being made (Red Cross) that freezes at a lower temperature and may be used to great advantage in this respect.

Dynamite is exploded by means of a cap and fuse. The cap is a heavy explosive and needs to be handled with as much care or more than the dynamite.

To prepare the charge for explosion, the hole should first be placed under the stump. The hole should be made with a crow-bar or 2-inch auger, the common carpenter's auger being used. The shank of the auger should be lengthened to 4 or 5 feet and a loop put on the end thru which the handle may be inserted instead of fastening it on with rivets or burs as formerly.

Placing the hole under the stump is one of the most important features of successful dynamiting.

The position and depth of the hole will vary with the stumps of different kinds of trees, but for the pine stump with large spreading roots the hole should be put down in the ground as far below the base of the stump as the stump is wide in diameter.

For a stump two feet in diameter the bottom of the hole should be two feet below the base of the stump, and under the center, or so that the explosion will take place directly under the center.

When the dynamite is placed too close to the stump it is apt

to split the stump and the force pass off into the air before it gets a lift on the roots, and the stump is left in the ground.

To attach the cap and fuse to the dynamite, cut off a piece of fuse the desired length and insert the end in the cap. Make a hole in the stick of dynamite with a sharpened stick about the size of a lead pencil and insert the cap and end of fuse into this. If the dynamite has to be placed a considerable depth in the ground it is necessary to tie the fuse to the dynamite so that there will be no danger of its pulling out.

When more than one stick of dynamite is used it is necessary to use only one cap and fuse, the one explosion sets the whole off.

After the charge has been placed in the ground the hole should be filled in and well tamped, tamping the earth well next to the dynamite. The more firm the tamping the more effective the explosion.

The fuse should be long enough to come six inches above the surface of the ground so that it may be easily lit.

A fuse two feet long will give the operator plenty of time to retreat a safe distance before the explosion.

Dynamite works most effectively when the ground is wet. It is more effective in a clay than in a sandy soil. Stumps that have stood a few years are removed with less force than if blown when green.

The best practice in clearing up a farm is to get off the brush and down timber, work the land with a disk (Clark disk preferable) and seed down to clover

and timothy. Pasture two or three years and then remove stumps and break.

The clover and trampling of the ground by the stock helps to prepare it for a crop.

There are over ten million acres of high land in Northeastern Minnesota that are well adapted to profitable agriculture but which are unused on account of stumps.

To remove these stumps is one of the most important problems of the state. It would mean an increased production of farm products equal to one-third of the entire production of the state at the present time.

Cheap dynamite and a general knowledge of its use will go a long way toward solving this problem.

In the present legislature the

subject of cheaper dynamite is under discussion, and it is probable that a bill will be passed to this effect, either for the manufacture of dynamite or buying and delivering to the farmer at cost.

Thru cooperation and buying in large quantity farmers can get dynamite at wholesale prices and in this way make a material saving.

An acre of land cleared and under proper cultivation will usually pay the cost of clearing in the first crop.

In the midst of Northeastern Minnesota is one of the best markets for farm products in the middle west; Duluth and the iron range towns.

There is need of the land being cleared. It will pay to clear it.

THE RELATIONSHIP of the LIQUOR TRAFFIC TO AGRICULTURE IN NORTHEASTERN MINNESOTA

In nearly every village, town and city in Northeastern Minnesota are saloons. The average in number is about one to every 250 population, not of the population of the towns alone, but of the entire population, country and town.

Most of these saloons were built up for the lumbering industry, those of recent years for the mining industry.

The lumbering industry is practically over in the greater part of Northeastern Minnesota. The mining industry occupies relatively but a small area.

The coming industry of Northeastern Minnesota is that of agriculture. It is this industry that will give employment to the greatest number of people, and

it is the source from which will come the greatest wealth.

The development of agriculture in Northeastern Minnesota is yet to be made. Not one tenth of the entire area is in the hands of actual farmers, not one tenth of that under cultivation.

The task is an enormous one; the clearing of the land, the building of roads, and the drainage of its great swamp areas. But back of this is the assurance of repayment. In the first foot of soil is a greater wealth than in all the mines. When under the plow and wisely husbanded the agricultural lands of Northeastern Minnesota now unoccupied will provide homes and well paid employment for over a hundred thousand families.

The building up of this agriculture, of farming, the rapidity of its development, and the profit of its returns will depend upon the character and industry of the men who engage in it, and not only this, but upon the character and practices of the local government.

Any influence that is not for development, that weakens and thwarts the strength and industry of the working people, or diverts public funds into channels from which no good is derived, that influence has no place in Northeastern Minnesota today.

Such is the influence of the liquor traffic. It is not denied, but it is believed to bring money to a town. It is believed that it helps to pay the taxes, that it is the means of securing money which otherwise would be sent out of the country.

The argument that a saloon is a financial aid to a town is commonly used in behalf of the liquor traffic, but it is not true. The only source of wealth to any community, the only abiding prosperity lies in production. The saloon produces absolutely nothing, nothing that is desirable or helpful to any normal man, woman or child.

That a saloon is a financial aid to any community has never been proven. That it is a positive detriment may be read on the record books of every county in Northeastern Minnesota.

Please note the following from the 1908 annual report of one of the leading counties.

Expense, district court	\$11,299.00
Expense, justice court.	4,211.00
Board of prisoners at county jail	2,198.00
County poor	8,806.00

Total\$26,514.00

Over 75 per cent of this entire expense was directly due to crimes developed thru the influence of the liquor traffic, and thru poverty arising from earnings being spent for drink instead of the necessities of life.

These twenty-six thousand dollars for the conviction of criminals and the relief of poverty may have been justly expended under the circumstances, but while we expend so much to run down the unfortunate criminal and to relieve the poor, would it not also be well to look into the cause of this horrible catalog of crime and poverty, and to devote some attention to its prevention, rather than so much to its relief?

The convicted criminal is a criminal still, and the family whose husband and father is a worthless drunkard finds small solace and but little help from the hand of public charity.

It is time a halt was called to this unnatural and unnecessary expense, and from the farmers' standpoint more than any other, for it is against the land that this tax will be largely charged.

In some of the counties the land tax has already nearly reached the limit, and for what? Not for roads or bridges, the crying need of the country but for court trials, for the trials of crime, crime that has its origin in the saloon, in the drunkenness, idleness, poverty and political degradation that they cause,

saloons built for the so-called "lumber jack" and "miner." "They will spend their money anyway" 'tis said, "so it don't matter." But it has mattered in that the men who have tried to make an honest living, to make their homes here, and to build up the country are now having to pay over twenty-thousand dollars a year in taxes in a single county for criminal courts, poor houses, and the burial of paupers.

That tax is needed for the building of roads and schools, for the development of the country.

Remove the liquor traffic and it may be so used.

If the only effects of the saloon were in an increased tax it might be borne, but this is only secondary to the waste of time and industry it causes, to the able bodied men who cease steady employment and become saloon-loafers and tramps, worthless to themselves, a disgrace to their family, and a burden to the public.

You see that man in the gutter and you scorn him a worthless drunkard, yet that man a few years ago was on a farm,—a producer—a benefit to the whole community, but thru drink he has become what he is. You may put him in jail at the expense of the taxpayers but if that saloon had not been there that man would have been an industrious citizen.

We tolerate the saloon for the miserable license it pays, believing it a source of revenue, but no saloon has ever yet created one dollar, but that man the saloon made a drunkard and a pauper was a producer. His

labor might have cleared up a farm from which more of the necessities of life could have been produced. Had his money not been spent in the saloon it would have been expended for a better home, for farm machinery, for merchandise.

Who will say that such a man is not worth more to a community than the \$500 license the saloon buys its' existance with? But every saloon in Northeastern Minnesota is the ruination of more than one man every year.

That miner, had he not been thrown in contact with the saloon would have saved his money and in a few years bought a farm. He would have become a producer, and his labor on the farm would result in cheaper and better farm products for the people in town.

But you saw only the license money from the saloon as being helpful to the town and you allowed the saloon to poison and rob him. You got part of his money thru the license it is true, but you will pay it back twice over in the results that will follow; the results of a depraved man—robbery, murder, court trials, a burdensome tax for the conviction of criminals instead of for the upbuilding of the country.

The saloons and their followers have had their way. They have filled the jails and poor houses and the potter's fields, and placed an indebtedness on many sections of the country that will take years to remove.

The man in the lumber business did not need to care. He could leave the country when

the trees were down, but the farmer is here to stay.

The farmer's business is one in which the home and family constitute the foundation. The saloon more than all other evils combined is most disastrous to the home.

That farm woman waiting there on the street corner, with faded clothes and a care-worn face, and toil-worn hands represents a home that knows the blighting influence of the saloon.

"When," she asked, "are the saloons to be removed from this town?" "I heard that they were going to be." "The timber we once had on the farm and that might have made us comfortable my husband spent for liquor, and now he is spending what little we can make on the farm and I don't know what to do."

That same cry is in the hearts of hundreds of farm women who

came here to the wilderness and have borne its privations and hardships and loneliness and year by year their hopes have died until they "don't know what to do."

God forbid that this state of affairs should longer exist.

The saloon stands in the way of progressive farming—by poisoning the farmer who drinks, and by breaking the heart of his family, by robbing the farmer who doesn't drink thru taxation for crime and poverty and in degrading the working men of the woods and mines who otherwise would seek homes on the land thru their earnings and become useful citizens.

The saloons must go if Northeastern Minnesota is to become the prosperous farming section that its rich resources entitle it to be.

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REPORT OF THE
NORTHEAST EXPERIMENT FARM
Grand Rapids
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